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COPC: 1,2-Dichloroethane CAS 107-06-2

Test Organisms: Mouse (Omnivore, Order-Rodentia)

Exposure Medium: Drinking water

Test Endpoint: NOAEL

Reference: Lane, R.W., B.L. Riddle, and J.F. Bozelleca, 1982, "Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice," *Toxicology and Applied Pharmacology*, Vol. 63, pp. 409-421.

QCE: 50 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Study exposure through two generations and included critical life stages. Three dose levels: 5, 15, and 50 mg/kg/day.
Q ₁	1	1	1	ERAdologically relevant endpoint (pup survival, weight gain, fertility, gestation, viability, lactation, reproduction).
Q ₂	1	1	1	Chronic study (two generations)
Q ₃	1	1	1	NOAEL
U	2	2	2	Because no significant differences were observed at any dose level the maximum dose considered was a NOAEL.
M	0.5	0.5	0.5	Placed in the drinking water.
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U * M = \text{Total AF}$
QCE (mg/kg-day)	50	50	50	QCE = quantified critical endpoint
TRV	50	25	17	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	50	Test organism is in the same order and trophic level as the functional group members	none
2	25	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	17	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**1,2-Dichloroethane** CAS 107-06-2**Test Organisms:**

Chicken (Omnivore, Order-Galliformes)

Exposure Medium:

Oral in diet

Test Endpoint:

NOAEL

Reference:

Alumot, E., M. Meidler, and P. Holstein, 1976, "Tolerance and acceptable daily intake of ethylene dichloride in the chicken diet," *Food and Cosmetic Toxicology*, Vol. 14, pp. 111–114.

QCE:

17.2 mg/kg-day (250mg/kg food) (0.11kg food/day)/1.6kg BW

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	2	2	2	Chickens given 1,2-dichloroethane at two doses: 250 and 500 ppm.
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (two years and during a critical lifestage)
Q ₃	1	1	1	NOAEL
U	1	1	1	Egg production was reduced at the 500 ppm dose but was not affected at the 250 ppm dose; the 250 ppm was considered the NOAEL and the 500 ppm dose the LOAEL due to this result.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	17.2	17.2	17.2	QCE = quantified critical endpoint
TRV	8.6	4.3	2.9	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	8.6	Test organism is in the same order and trophic level as the functional group members	none
2	4.3	Test organism is in a different order and same trophic level from the functional group members	AV422, AV432, AV433, AV442
3	2.9	Test organism is in a different order and trophic level from the functional group members	AV121, AV122, AV132, AV142, AV143, AV210, AV210A, AV221, AV222, AV222A, AV232, AV233, AV241, AV242, AV310, AV322, AV333, AV342

COPC: 1,3-Dinitrobenzene CAS 99-65-0

Test Organisms: Rat (Omnivore, Order-Rodentia)

Exposure Medium: Drinking water

Test Endpoint: NOAEL

Reference: Cody, T.E., et al., 1981, "1,3-Dinitrobenzene: Toxic effects *in vivo* and *in vitro*," *Journal of Toxicology and Environmental Health*, Vol. 7, pp. 829–847.

QCE: 0.4 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of 20 male and 20 female weanling rats
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (16 weeks)
Q ₃	1	1	1	NOAEL
U	2	2	2	Slight to moderate decrease in spermatogenesis; middle exposure level was associated with increased spleen weights; this reaction may be related to handling stress rather than compound administration; it was difficult to classify the exposure level as a NOAEL or a LOAEL.
M	0.5	0.5	0.5	Placed in the drinking water
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U * M = \text{Total AF}$
QCE (mg/kg-day)	0.4	0.4	0.4	QCE = quantified critical endpoint
TRV	0.4	0.2	0.1	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.4	Test organism is in the same order and trophic level as the functional group members	none
2	0.2	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.1	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**1,3-Dinitrobenzene CAS 99-65-0****Error! Bookmark not defined.****Test Organisms:**

Rat (Omnivore, Order-Rodentia)

Exposure Medium:

Gavage

Test Endpoint:

LOAEL

Reference:Linder, R.E., R.A. Hess, and L.F. Strader, 1986, "Testicular toxicity and infertility in male rats treated with 1,3-dinitrobenzene," *Journal of Toxicology and Environmental Health*, Vol. 19, pp. 477–489.**QCE:**

0.54 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Groups of 12 male Sprague-Dawley rats
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (5 days/week for 12 weeks)
Q ₃	2	2	2	LOAEL
U	1	1	1	Treated males had reduction in cauda sperm reserves and testicular spermhead counts, and had reduced litter sizes after mating; reproductive data showed a dose-response relationship
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.54	0.54	0.54	QCE = quantified critical endpoint
TRV	0.27	0.14	0.09	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.27	Test organism is in the same order and trophic level as the functional group members	none
2	0.14	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.09	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 1,3,5-TNB (1,3,5-Trinitrobenzene) CAS 99-35-4

Test Organisms: Rat (Omnivore, Order-Rodentia)

Exposure Medium: Drinking water

Test Endpoint: NOAEL

Reference: Cody, T.E., et al., 1981, "1,3-Dinitrobenzene: Toxic Effects *in vivo* and *in vitro*," *J. Toxicol. Environ. Health*, Vol. 7(5), pp. 829–847.

QCE: 0.5 mg/kg/d

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	3	3	3	Unclear as to whether the effects in the test species were due to handling stress rather than compound administration
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	2	2	2	Subchronic exposure (16 weeks)
Q ₃	1	1	1	NOAEL
U	3	3	3	Based on an analogy to a subchronic study in 1,3-DNB and adjusted for molecular weight.
M	0.5	0.5	0.5	Placed in the drinking water
Total AF	9	18	27	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.5	0.5	0.5	QCE = quantified critical endpoint
TRV	5.55E-2	2.78E-2	1.85E-2	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	5.55E-2	Test organism is in the same order and trophic level as the functional group members	none
2	2.78E-2	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	1.85E-2	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 1,4-Dioxane CAS 123-91-1

Test Organisms: Rat (Omnivore, Order-Rodentia)

Exposure Medium: Oral intubation

Test Endpoint: NOAEL

Reference: Giavini, E., C. Vismara, and L. Broccia, 1985, "Teratogenesis study of dioxane in rats," *Toxicology Letters*, Vol. 26, pp. 85–88.

QCE: 0.5 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Rats were given 1,4-dioxane at three dose levels: 0.25, 0.5, and 1.0 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (days 6–15 of gestation)
Q ₃	1	1	1	NOAEL
U	1	1	1	Maternal toxicity and reduced fetal weights were observed among the rats receiving the 1.0 mg/kg/day dose while the other two doses had no effects on the rats. The 0.5 mg/kg/day dose was thus considered the NOAEL and the 1.0 mg/kg/day dose was considered the LOAEL.
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.5	0.5	0.5	QCE = quantified critical endpoint
TRV	0.50	0.25	0.17	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.50	Test organism is in the same order and trophic level as the functional group members	none
2	0.25	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.17	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 2,4-Dinitrotoluene CAS 121-14-2

Test Organisms: Dog (Omnivore, Order-Carnivora)

Exposure Medium: Diet

Test Endpoint: LOAEL

Reference: Ellis, H.V., et al., 1985, "Subchronic and chronic toxicity studies of 2,4-dinitrotoluene. Part I. Beagle dogs," *Journal of the American College of Toxicology*, Vol. 4(4), pp. 233–242.

QCE: 1.5 mg/kg/day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	24 males and 24 females were divided into four groups of six males and six females
Q ₁	1	1	1	Ecologically relevant endpoints (nervous system, weight gain, reproductive effects)
Q ₂	1	1	1	Chronic study (two years)
Q ₃	2	2	2	LOAEL
U	2	2	2	Only one dog at the 1.5 mg/kg/day dose was affected
Total AF	4	8	12	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	1.5	1.5	1.5	QCE = quantified critical endpoint
TRV	0.38	0.19	0.13	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.38	Test organism is in the same order and trophic level as the functional group members	M422A
2	0.19	Test organism is in a different order and same trophic level from the functional group members	M422
3	0.13	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M123, M210, M210A, M222, M322

COPC:

2,4-Dinitrotoluene CAS 121-14-2**Error! Bookmark not defined.**

Test Organisms:

Rat (Omnivore, Order-Rodentia)

Exposure Medium:

Diet

Test Endpoint:

LOAEL

Reference:

Lee, C.C., et al., 1985, "Subchronic and chronic toxicity studies of 2,4-dinitrotoluene. Part II. CD rats," *Journal of the American College of Toxicology*, Vol. 4(4), pp. 243–256.

QCE:

34 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Groups of 38 male and female weanling rats (CD strain)
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (six months)
Q ₃	2	2	2	LOAEL
U	1	1	1	Multigenerational study; highest dietary level was associated with reduced fertility
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	34	34	34	QCE = quantified critical endpoint
TRV	17	8.5	5.7	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	17	Test organism is in the same order and trophic level as the functional group members	none
2	8.5	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	5.7	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**2,4-Dinitrotoluene** CAS 121-14-2**Test Organisms:**

Mouse (Omnivore, Order-Rodentia)

Exposure Medium:

Diet

Test Endpoint:

LOAEL

Reference:Hong, C.B., et al., 1985, "Subchronic and chronic toxicity studies of 2,4-dinitrotoluene. Part III. CD-1 mice," *Journal of the American College of Toxicology*, Vol. 4(4), pp. 257-269.**QCE:**

14 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Groups of 38 male and female weanling mice (CD-1 strain)
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (two years)
Q ₃	2	2	2	LOAEL
U	2	2	2	Males exposed to this dose equivalent had a decreased body weight gain. No NOAEL was established.
Total AF	4	8	12	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	14	14	14	QCE = quantified critical endpoint
TRV	3.5	1.8	1.2	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	3.5	Test organism is in the same order and trophic level as the functional group members	none
2	1.8	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	1.2	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**2,4,6-Trinitrotoluene** CAS 118-96-7**Test Organisms:**

Mouse (Omnivore, Order-Rodentia)

Exposure Medium:

Diet

Test Endpoint:

NOAEL

Reference:Dilley, J.V., et al., 1982, "Short-term oral toxicity of 2,4,6-trinitrotoluene in mice, rats, and dogs," *Journal of Toxicology and Environmental Health*, Vol. 9, pp. 565-585.**QCE:**

10 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	5 groups of mice contained 20 males and 20 females
Q ₁	1	1	1	Ecologically relevant endpoint (growth)
Q ₂	1	1	1	Chronic study (2 years)
Q ₃	1	1	1	NOAEL
U	2	2	2	Reduction in body weight gain, sporadic anemia, and an increased incidence of combined leukemia/malignant lymphoma
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	10	10	10	QCE = quantified critical endpoint
TRV	5.0	2.5	1.7	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	5.0	Test organism is in the same order and trophic level as the functional group members	none
2	2.5	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	1.7	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**2,4,6-Trinitrotoluene** CAS 118-96-7**Test Organisms:**

Rat (Omnivore, Order-Rodentia)

Exposure Medium:

Diet

Test Endpoint:

NOAEL

Reference:

Furedi, E.M., et al., 1984, *Determination of the Chronic Mammalian Toxicological Effects of TNT (Twenty-Four Month Chronic Toxicity/Carcinogenicity Study of Trinitrotoluene (TNT) in the Fischer 344 Rats)*, Final Report – Phase III, Vol. 1, ITT Research Institute, Project No. L6116 Study No. 9, Chicago, Illinois, DAMD17-79-C-9120, AD-A168 637.

QCE:

0.4 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of rats (75 males and 75 females per group) were administered one of four doses: 0.4, 2.0, 10.0, or 50.0 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoints (effects on spleen, liver, kidney, chronic lifetime tested)
Q ₂	1	1	1	Chronic study (2 years)
Q ₃	1	1	1	NOAEL
U	2	2	2	The major toxic effects included anemia with secondary spleen lesions, hepatotoxicity, and urogenital lesions. Lesions to the liver, kidneys, and urinary bladder were observed. No signs of toxicity were observed at the 0.4 mg/kg/day dose making it the NOAEL and the 2.0 mg/kg/day dose the LOAEL.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.4	0.4	0.4	QCE = quantified critical endpoint
TRV	0.20	0.10	0.07	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.20	Test organism is in the same order and trophic level as the functional group members	none
2	0.10	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.07	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 2,4,6-Trinitrotoluene CAS 118-96-7Error! Bookmark not defined.

Test Organisms: Beagle Dog (Omnivore, Order-Carnivora)

Exposure Medium: Capsule

Test Endpoint: LOAEL

Reference: Levine, B.S., et al., 1983b, *Determination of the Chronic Mammalian Toxicological Effects of TNT: Twenty-Six Week Subchronic Oral Toxicity Study of Trinitrotoluene (TNT) in the Beagle Dog, Phase II*, Final Report, IIT Research Institute, Report No. L6116, Study No. 5, Chicago, Illinois, DAMD 17-79-C-9120, AD-A157 082.

QCE: 0.5 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of beagle dogs (6 males and 6 females per group) were administered one of four doses: 0.5, 2.0, 8.0, or 32.0 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoints (lethality, food consumption)
Q ₂	1	1	1	Chronic study (26 weeks)
Q ₃	2	2	2	LOAEL
U	2	2	2	The highest dose (32 mg/kg/day) proved to be lethal. The other three doses produced minor hepatocyte cloudy swelling and hepatic cell enlargement.
Total AF	4	8	12	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.5	0.5	0.5	QCE = quantified critical endpoint
TRV	0.13	0.06	0.04	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.13	Test organism is in the same order and trophic level as the functional group members	M422A
2	0.06	Test organism is in a different order and same trophic level from the functional group members	M422
3	0.04	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M123, M210, M210A, M222, M322

COPC:**2,6-Dinitrotoluene** CAS 606-20-2**Test Organisms:**

Mouse (Omnivore, Order-Rodentia)

Exposure Medium:

Diet

Test Endpoint:

LOAEL

Reference:

Lee, C.C., et al., 1976, *Mammalian Toxicity of Munitions Compounds, Phase II, Effects of Multiple Doses, Part III: 2,6-Dinitrotoluene, Progress Report No. 4*, Midwest Research Report Institute Project No. 3900-B, Contract No. DAMD-17-74-C-4073.

QCE:

51 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of 16 female and 16 male albino Swiss mice were fed 0.01, 0.05, or 0.25% of 2,6-DNT in powdered standard rodent chow (11, 55, and 289 mg/kg/day, respectively).
Q ₁	1	1	1	Ecologically relevant endpoints (weight gain, reproductive effects)
Q ₂	1	1	1	Chronic study (13 weeks)
Q ₃	2	2	2	LOAEL
U	1	1	1	The 11 mg/kg/day dose produced no effects. The higher two doses produced decreases in feed consumption and weight gain along with atrophy in the testes. Mice fed the 51 mg/kg/day dose were affected less severely than the 289 mg/kg/day dose so it was considered the LOAEL.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	51	51	51	QCE = quantified critical endpoint
TRV	25.5	12.8	8.5	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	25.5	Test organism is in the same order and trophic level as the functional group members	none
2	12.8	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	8.5	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 2,6-Dinitrotoluene CAS 606-20-2

Test Organisms: Rat (Omnivore, Order-Rodentia)
Exposure Medium: Diet
Test Endpoint: LOAEL
Reference: Lee, C.C., et al., 1976, *Mammalian Toxicity of Munitions Compounds, Phase II, Effects of Multiple Doses, Part III: 2,6-Dinitrotoluene, Progress Report No. 4*, Midwest Research Report Institute Project No. 3900-B, Contract No. DAMD-17-74-C-4073.
QCE: 35 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of 16 female and 16 male CD rats were fed doses of 2,6-DNT at levels: 7, 35, 145 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoints (weight gain, reproductive effects)
Q ₂	1	1	1	Chronic study (13 weeks)
Q ₃	2	2	2	LOAEL
U	1	1	1	The 7 mg/kg/day dose produced no effects. The higher two doses produced decreases in feed consumption and weight gain along with atrophy in the testes. Rats fed the 35 mg/kg/day dose were affected less severely than the 145 mg/kg/day dose so it was considered the LOAEL.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	35	35	35	QCE = quantified critical endpoint
TRV	17.5	8.8	5.8	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	17.5	Test organism is in the same order and trophic level as the functional group members	none
2	8.8	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	5.8	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: 2,6-Dinitrotoluene CAS 606-20-2Error! Bookmark not defined.

Test Organisms: Dog (Omnivore, Order-Carnivora)

Exposure Medium: Diet

Test Endpoint: LOAEL

Reference: Lee, C.C., et al., 1976, *Mammalian Toxicity of Munitions Compounds, Phase II, Effects of Multiple Doses, Part III: 2,6-Dinitrotoluene, Progress Report No. 4*, Midwest Research Report Institute Project No. 3900-B, Contract No. DAMD-17-74-C-4073.

QCE: 20 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of four females and four male beagle dogs were given 4, 20, or 100 mg/kg/day of 2,6-DNT in capsules.
Q ₁	1	1	1	Ecologically relevant endpoints (weight gain, reproductive effects)
Q ₂	1	1	1	Chronic study (13 weeks)
Q ₃	2	2	2	LOAEL
U	2	2	2	The 4 mg/kg/day dose showed little if any toxic effects while the 20 and 100 mg/kg/day doses showed more severe effects. The latter two doses produced decreased feed intake and atrophy of the testes. All dogs in the 100 mg/kg/day dose group died so the 20 mg/kg/day was considered the LOAEL.
Total AF	4	8	12	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	20	20	20	QCE = quantified critical endpoint
TRV	5.0	2.5	1.7	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	5.0	Test organism is in the same order and trophic level as the functional group members	M422A
2	2.5	Test organism is in a different order and same trophic level from the functional group members	M422
3	1.7	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M123, M210, M210A, M222, M322

COPC: **HMX** (Cyclotetramethylenetetranitramine) CAS 2691-41-0

Test Organisms: Rat (Omnivore, Order-Rodentia)

Exposure Medium: Diet

Test Endpoint: NOAEL

Reference: Everett, D.J., I.R. Johnson, P. Hudson, and M. Jones, 1985, *HMX: 13-Week Toxicity Study in Mice by Dietary Administration*, AD A171601, Inveresk Research International, Final Reports, Contract No. DAMD17-80-C-0053, IRI, Ltd., Musselburgh, Scotland.

QCE: 50 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Adequate number of male and female rats tested
Q ₁	1	1	1	Ecologically relevant endpoints (liver, kidney damage, decreased weight gain)
Q ₂	1	1	1	Chronic study (13 weeks)
Q ₃	1	1	1	NOAEL
U	1	1	1	A NOAEL of 50 mg/kg/day was established and a LOAEL of 150 mg/kg/day was observed. Hepatocellular changes were observed; Histopathological and physiological signs of renal dysfunction were also seen.
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	50	50	50	QCE = quantified critical endpoint
TRV	50	25	17	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	50	Test organism is in the same order and trophic level as the functional group members	none
2	25	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	17	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**Nitrate (as Potassium nitrate)** CAS 7757-79-1**Test Organisms:**

Guinea pigs (Omnivore, Order-Rodentia)

Exposure Medium:

Oral in drinking water

Test Endpoint:

NOAEL

Reference:Sleight, S.D. and O.A. Atallah, 1968, "Reproduction in the guinea pig as affected by chronic administration of potassium nitrate and potassium nitrite," *Toxicology and Applied Pharmacology*, Vol. 12, pp. 179–185.**QCE:**

507 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Guinea pigs administered potassium nitrate at four dose levels: 12, 102, 507, and 1130 mg nitrate-nitrogen kg/day.
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (143–204 days during a critical lifestage)
Q ₃	1	1	1	NOAEL
U	2	2	2	The 1130 mg/kg/d dose reduced the number of live births while the other three doses showed no adverse effects. Because of this the 507 mg/kg/d dose was considered the NOAEL and the 1130 mg/kg/d dose the LOAEL.
M	0.5	0.5	0.5	Placed in drinking water.
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U * M = \text{Total AF}$
QCE (mg/kg-day)	507	507	507	QCE = quantified critical endpoint
TRV	507	254	169	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	507	Test organism is in the same order and trophic level as the functional group members	none
2	254	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	169	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: Nitrobenzene CAS 98-95-3

Test Organisms: Mouse (Omnivore, Order-Rodentia)

Exposure Medium: Inhalation

Test Endpoint: LOAEL

Reference: CIIT (Chemical Industry Institute of Toxicology), 1984, *Ninety-day inhalation toxicity study of nitrobenzenes in F344 rats and B6C3F1 mice*, Research Triangle Park, NC, FYI-OTS-0874-0333.

QCE: 4.6 mg/kg-day (25 mg/cu.m * 6 hr/24 hr * 5 days/7 days * 0.039 cu.m/day / 0.03 kg * 0.8)

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	2	2	2	10 animals/sex/species/dose group were administered 1 of 3 doses
Q ₁	1	1	1	Ecologically relevant endpoints (hematology; adrenal, renal, hepatic lesions)
Q ₂	1	1	1	Chronic study
Q ₃	2	2	2	LOAEL
U	2	2	2	Other than vacuolization of adrenal cortical cells in females, adverse effects of nitrobenzene exposure in mice were comparable to unexposed controls at this dose.
Total AF	8	16	24	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	4.6	4.6	4.6	QCE = quantified critical endpoint
TRV	0.58	0.29	0.19	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.58	Test organism is in the same order and trophic level as the functional group members	none
2	0.29	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.19	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: Nitrobenzene CAS 98-95-3
Test Organisms: Rat (Omnivore, Order-Rodentia)
Exposure Medium: Oral (gavage)
Test Endpoint: FEL
Reference: Levin, A.A., 1988, "The reversibility of nitrobenzene induced testicular toxicity: Continuous monitoring of sperm output from vasocystotomized rats", *Toxicology*, Vol. 53, pp. 219–230.
QCE: 300 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	2	2	2	Only males tested, but numbers were adequate. Observed effects in the study were noted at lower levels via inhalation
Q ₁	1	1	1	Ecologically relevant endpoint (Decreased sperm production).
Q ₂	3	3	3	Acute study duration
Q ₃	3	3	3	FEL
U	3	3	3	Reasonable design, looked at reproductive (sperm generation) endpoint and morphological endpoints. No NOAEL and LOAEL established, only one dose tested.
Total AF	54	108	162	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	300	300	300	QCE = quantified critical endpoint
TRV	5.56	2.78	1.85	Toxicity Reference Value = QCE/Total AF

Appropriate Functional Groups:

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	5.56	Test organism is in the same order and trophic level as the functional group members	none
2	2.78	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	1.85	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC:**Pentachloronitrobenzene (PCNB)** CAS 82-68-8**Test Organisms:**

Chicken (Omnivore, Order-Galliformes)

Exposure Medium:

Oral in diet

Test Endpoint:

NOAEL

Reference:Dunn, J.S. et al., 1979, "Effect of pentachloronitrobenzene upon egg production, hatchability, and residue accumulation in the tissues of White Leghorn hens," *Toxicology and Applied Pharmacology*, Vol. 48, pp. 425–433.**QCE:**

7.07 mg/kg-day (100mg/kg food)(106g food/day)(1kg/1000g)/1.5kg BW

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Hens tested at four dose levels: 10, 50, 100, and 1000 ppm.
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study, 35 weeks (>10 during a critical lifestage)
Q ₃	1	1	1	NOAEL
U	2	2	2	Egg production and egg hatchability was reduced among birds receiving the 1000 ppm dose. No effects were observed at the other dose levels so the 100 ppm dose was considered the NOAEL.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	7.07	7.07	7.07	QCE = quantified critical endpoint
TRV	3.54	1.77	1.18	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	3.54	Test organism is in the same order and trophic level as the functional group members	none
2	1.77	Test organism is in a different order and same trophic level from the functional group members	AV422, AV432, AV433, AV442
3	1.18	Test organism is in a different order and trophic level from the functional group members	AV121, AV122, AV132, AV142, AV143, AV210, AV210A, AV221, AV222, AV222A, AV232, AV233, AV241, AV242, AV310, AV322, AV333, AV342

COPC:**Pentachlorophenol (PCP)** CAS 87-86-5**Test Organisms:**

Rat (Omnivore, Order-Rodentia)

Exposure Medium:

Oral in diet

Test Endpoint:

NOAEL

Reference:Schwetz, B.A., et al., 1978, *Results of two-year toxicity and reproduction studies on pentachlorophenol in rats*, pp. 301–309, in: R. Rao, ed., *Pentachlorophenol: Chemistry, Pharmacology, and Environmental Toxicology*, Plenum Press, New York, p. 401.**QCE:**

0.24 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	2	2	2	Rats tested at two dose levels: 3 and 30 ppm
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (62 days prior to mating, 15 days during mating, and through gestation and lactation).
Q ₃	1	1	1	NOAEL
U	1	1	1	No adverse effects were observed at the 3 ppm level while survival and growth were significantly reduced, greater than 20%, in rats fed the 30 ppm dose. The 3 ppm dose was considered the NOAEL and the 30 ppm dose was considered the LOAEL.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.24	0.24	0.24	QCE = quantified critical endpoint
TRV	0.12	0.06	0.04	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.12	Test organism is in the same order and trophic level as the functional group members	none
2	0.06	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.04	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: **RDX** (Hexahydro-1,3,5-Trinitro-1,3,5-Triazine) CAS 121-82-4

Test Organisms: Rat (Omnivore, Order-Rodentia)

Exposure Medium: Diet

Test Endpoint: NOAEL

Reference: Levine, B.S., et al., 1983a, *Determination of the Chronic Mammalian Toxicological Effects of RDX: Twenty-Four Month Chronic Toxicity/Carcinogenicity Study of Hexahydro-1,2,3-Trinitro-1,3,5-Triazine (RDX) in the Fischer 344 Rat, Phase V, Vol. 1*, AD A160774, Chicago, Illinois, IIT Research Institute, United States Army Medical Research and Development Command, Contract No. DAMD17-79-C-9161.

QCE: 0.3 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Four groups of 150 rats per dose (75 male and 75 female) were given one of four doses: 0.3, 1.5, 8.0, and 40.0 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoint (reproduction)
Q ₂	1	1	1	Chronic study (two years)
Q ₃	1	1	1	NOAEL
U	1	1	1	Suppurative inflammation of the prostate was observed in rats receiving the 1.5 mg/kg/day dose or greater while the 0.3 mg/kg/day dose showed no signs of toxicity. For this reason, the 0.3 mg/kg/day dose was considered the NOAEL and the 1.5 mg/kg/day dose was the LOAEL.
Total AF	1	2	3	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	0.3	0.3	0.3	QCE = quantified critical endpoint
TRV	0.30	0.15	0.10	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	0.30	Test organism is in the same order and trophic level as the functional group members	none
2	0.15	Test organism is in a different order and same trophic level from the functional group members	M422, M422A
3	0.10	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M132, M210, M210A, M222, M322

COPC: **RD**X (Hexahydro-1,3,5-Trinitro-1,3,5-Triazine) CAS 121-82-4

Test Organisms: Dog (Omnivore, Order-Carnivora)

Exposure Medium: Diet

Test Endpoint: NOAEL

Reference: Hart, E.R., 1974, *Subacute Toxicity of RDX and TNT in Dogs*, AD035717, Litton Bionetics, Inc., Kensington, Maryland, Office of Naval Research, Contract No. N00014-73-C-0162.

QCE: 10 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	1	1	1	Large number of female and male dogs were divided into three groups and given one of three doses: 0.1, 1.0, or 10 mg/kg/day.
Q ₁	1	1	1	Ecologically relevant endpoints (appearance, behavior, appetite, elimination, growth)
Q ₂	1	1	1	Chronic study (90 days)
Q ₃	1	1	1	NOAEL
U	2	2	2	No adverse effects observed at the 10 mg/kg/day dose but it did induce vomiting of some of the dose. It is tentatively labeled the NOAEL while there was no LOAEL found.
Total AF	2	4	6	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	10	10	10	QCE = quantified critical endpoint
TRV	5.0	2.5	1.7	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	5.0	Test organism is in the same order and trophic level as the functional group members	M422A
2	2.5	Test organism is in a different order and same trophic level from the functional group members	M422
3	1.7	Test organism is in a different order and trophic level from the functional group members	M121, M122, M122A, M123, M210, M210A, M222, M322

COPC: **Tetryl** (2,4,6-Tetryl-Trinitophenylmethylnitramine) CAS 479-45-8

Test Organisms: Rabbit (Herbivores, Order-Lagomorpha)

Exposure Medium: Gavage

Test Endpoint: LOAEL

Reference: Fati, S. and E. Daniele, 1965, "Histopathological changes in experimental chronic tetryl poisoning," *Folia. Med.*, Vol. 48(4), pp. 269–276.

QCE: 130 mg/kg-day

Adjustment Factors (AF)				Justification for adjustment factor
R	1	2	3	R = 1 is AF for same order and trophic level R = 2 is AF for different order and same trophic level R = 3 is AF for different order and trophic level
I	2	2	2	Adequate number of organisms examined
Q ₁	0.5	0.5	0.5	Ecological relevance questionable
Q ₂	1	1	1	Chronic study (six to nine months)
Q ₃	2	2	2	LOAEL
U	2	2	2	Only one dose used and could be considered a frank effects rather than a LOAEL
Total AF	4	8	12	$R * I * Q_1 * Q_2 * Q_3 * U = \text{Total AF}$
QCE (mg/kg-day)	130	130	130	QCE = quantified critical endpoint
TRV	32.5	16.3	10.8	Toxicity Reference Value = QCE/Total AF

R Value	TRV (mg/kg-day)	Justification	Appropriate Functional Group
1	32.5	Test organism is in the same order and trophic level as the functional group members	none
2	16.3	Test organism is in a different order and same trophic level from the functional group members	M121, M122, M122A, M123, M132
3	10.8	Test organism is in a different order and trophic level from the functional group members	M210, M210A, M222, M322, M422, M422A